Longkong

Robert E. Paull
Department of Tropical Plant and Soil Sciences
University of Hawaii at Manoa, Honolulu, HI

Scientific Name and Introduction: There are at least two major types with a number of intermediate types of *Lansium domesticum* Jack., langsat (Malay, Thailand), longkong (Thailand - intermediate type), and duku (Malay, Thailand). Other names are lanson (Philippines) and intermediate types are referred to as duku-langsat in Malaysia (Nakasone and Paull, 1998). There is considerable inconsistency in the naming of the different types (Yaacob and Bamroongrugsa, 1992). Peninsular Thailand to Borneo is the major area of cultivation. Along with the Philippines, it is also cultivated in Vietnam, Burma, India, Sri Lanka, Australia, Surinam, and Puerto Rico.

Quality Characteristics and Criteria: Langsat fruit are more ovoid, roughly 30 to 60 mm (1.2 to 2.4 in) in diameter, while duku are rounder and 40 to 50 mm (1.6 to 2 in) in diameter; longkong is intermediate, nearly seedless, has a brittle skin and is the same size as langsat. There are 15 to 25 fruit per longkong raceme and 4 to 12 in duku. Skin of young fruit is pale green and turns yellow when ripe, frequently with brown blemishes. The langsat has a thin skin that contains a milky white sticky sap. Duku has a thicker skin (up to 6 mm; 0.25 in) and no latex. Longkong has a slightly thicker skin than langsat and less sap that is not sticky. The green seed is covered by a white translucent flesh that is slightly sour in langsat. Langsat tends to vary from sweet to sour with duku being sweet. Both fruit have five separate segments with one to five seeds in langsat and one or two in duku. During ripening, astringency in the flesh declines while sugars increases 6-fold (Paull et al., 1987). The skin bruises very easily leading to brown discoloration.

Horticultural Maturity Indices: Fruit are harvested at the full ripe stage indicated by the skin color change from light to dark yellow, dryness of the sepals and the peduncle (stem) losing most of its green color. The flesh is transparent when ripe. Fruit on the bunch generally ripen together, and over a very short period. Four to five harvests are necessary to harvest a tree. It is essential to harvest as soon as possible as over-ripe fruit abscise from the peduncle. Fruit to be shipped long distances are harvested when 70 to 80% ripe to avoid excessive fruit drop. Fruit should be picked when dry, as wet fruit can become moldy if packed wet.

Grades, Sizes and Packaging: There are no U.S. or international standards. Fruit are generally graded by size and color and normally sold in single layer fiberboard cartons of 2.25 kg (5 lb) with padding, sometimes in trays with liners.

Pre-cooling Conditions: Room-cooling is used due to moisture loss by forced-air cooling.

Optimum Storage Conditions: The most recent recommendation for storage is 18 °C (46 °F) with 90% RH (Piyasaengthong et al., 1997), giving about 21 days of storage-life. Previously, 11 to 14.4 °C (34 to 58 °F) with 85 to 90% RH for 2 weeks was recommended, which gave 24.3% weight loss (Pantastico, 1975). Others have recommended 11 to 13 °C (52 to 55 °F) with 85 to 90% RH for 14 days (Srivastava and Mathur, 1955).

Controlled Atmospheres (CA) Considerations: Fruit stored at 14.4 °C (58 °F) in 3% O_2 + 0% CO_2 had 16 days of postharvest life, compared to 9 days for fruit held in air (Pantastico et al., 1975). High CO_2 aggravated postharvest skin browning especially at 10% O_2; that can also occur in fruit held in

polyethylene film bags. Holding in plastic bags (0.08 mm thick) reduces weight loss but increases surface browning (Brown and Lizada, 1984). Preliminary recommendations are 5% O_2 + 0% CO_2 (Yahia, 1998).

Retail Outlet Display Considerations: Display in over-wrapped trays or closed styrene clam shell containers with no holes at 15 °C (59 °F). Do not mist.

Chilling Sensitivity: Chilling leads to skin browning; at 15 °C symptoms develop after 21 days (Piyasaengthong et al., 1997).

Ethylene Production and Sensitivity: Fruit produce low amounts of ethylene, with internal concentrations of 2 to 6 µL kg^{-1}. There are no reported responses to ethylene treatment; it may lead to premature senescence.

Respiration Rates:

Temperature	mg CO_2 kg^{-1} h^{-1}
9 °C	40 to 50
20 °C	50 to 90

Respiration rates decline after harvest, and small fruit have a higher rate than large fruit (Srivastana and Mathur, 1955; Pantastico et al., 1968). To get mL kg^{-1} h^{-1}, divide the mg kg^{-1} h^{-1} rate by 2.0 at 0 °C (32 °F), 1.9 at 10 °C (50 °F), and 1.8 at 20 °C (68 °F). To calculate heat production, multiply mg kg^{-1} h^{-1} by 220 to get BTU per ton per day or by 61 to get kcal per metric ton per day.

Physiological Disorders: Abrasion and impact injury, water loss, and chilling injury are the three major disorders. Mechanical injury (abrasion, impact and compression) leads to skin darkening and browning. Chilling injury symptoms are pitting and brown scalding of the skin.

Postharvest Pathology: Anthracnose, aspergillus and rhizopus surface rots on the skin have been reported. Packing dry fruit and the use of fungicides can be used to minimize losses.

Quarantine Issues: Longkong is a fruit fly host; irradiation at 300 Grays may have potential for disinfestation.

Suitability as Fresh-cut Product: No current potential.

Special Considerations: None.

References:

Brown, B.I. and M. C.C. Lizada. 1985. Modified atmospheres and deterioration of lanzones (*Lansium domesticum* Correa.). Postharvest Research Notes 1(2):36.

Nakasone, H.Y. and R.E. Paull. 1998. Tropical Fruits. CAB Intl, Wallingford, England, 445 pp.

Pantastico, Er.B. 1975. Postharvest physiology, handling and utilization of tropical and subtropical fruits and vegetables. AVI Pub., Westport, CT.

Pantastico, Er.B., D.B. Mendoza and R.M. Abilay. 1968. Some chemical and physiological changes during storage of lanzones (*Lansium domesticum* Correa.) The Philippines Agriculturist 52:505-517.

Paull, R.E., T. Goo, and N.J. Chen. 1987. Growth and compositional changes during development of lanzone fruit. HortScience 22:1252-1253.

Piyasaengthong, Y., S. Suanpairoj, P. Pakamat and C. Ruensamran. 1997. The optimum for storaging longkong (*Aglaia dookoo* Griff). 35th Kasetsart Univ. Conf., Bangkok, Thailand. (In Thai - English Summary).

Srivastana, H.C. and P.B. Mathur. 1955. Studies in the cold storage of langsat. J. Sci. Food Agric. 6:511-513.
Yaacob, O. and N. Bamroongrugsa. 1992. *Lansium domesticum* Correa. In: E.Verheij and R.E. Coronel (eds) Plant resources of South-East Asia, No. 2, Edible fruits and nuts. Prosea, Bogor, Indonesia.
Yahia, E. 1998. Modified and controlled atmospheres for tropical fruits. Hort. Rev. 22:123-183.